3. Right Lines not taking up more than $\frac{1}{3}$ of the Time of Deſcription of crooked Lines, as the Diameter is $\frac{2}{3}$ of the Semiperiphery, it appears, if only right Lines were uſed, theſe $\frac{1}{10}$ would be reduced to $\frac{2}{10}$, by the Subtraction of $\frac{1}{3}$ of $\frac{3}{10}$. But, becauſe the Number of right Lines, all things conſider'd, ſhould not be reckon'd but about double the Number of crooked ones, only $\frac{2}{3}$ of $\frac{1}{10}$ can be taken from the $\frac{1}{10}$; that is to ſay, the Time taken up in writing this Hand will be $\frac{9}{30} - \frac{2}{30} = \frac{7}{30}$ of the Time taken up in writing of the common Long-Hand, or or leſs than the $\frac{1}{4}$ of the Time.

As I have ſhewn all the Principles on which Short-Hands can be conſtructed to Advantage, I have no need to compare this with any other; becauſe I have enabled every Reader to judge of them, by ſhewing within what Limits all Improvements are bounded.

XV. *An Account of a Treatiſe by* Wm. Brownrigg *M.D. F.R.S. intituled,* "The "Art of making common Salt, as now "practiſed in moſt Parts of the World; "with ſeveral Improvements propoſed in "that Art, for the Uſe of the *Britiſh* Do-"minions;" *abſtracted by* W. Watſon *F. R. S.*

Gentlemen,

Read June 15. 1748. I RECEIVED your Commands to lay before you an Extract of our worthy Brother Dr. *Brownrigg*'s Book; which, though at

all times ready to execute whatever you think proper to charge me with to the utmoſt of my Abilities, I engaged in the more readily, from the Pleaſure and Inſtruction I had already received from the Peruſal of that excellent Work, in which its Author has eminently diſtinguiſhed himſelf both as a Chemiſt, and as a Philoſopher.

This Work conſiſts of 295 Pages in 8vo, excluſive of the Preface, and of 6 Copper-Plates, exhibiting different Views of Salt-Houſes, Inſtruments, *&c.* neceſſary to the Preparation of Salt. It is enriched likewiſe with Notes of great Importance to the Work, not only of the Author, but alſo from the *Philoſophical Tranſactions*, *Medical Eſſays*, *Memoirs of the Royal Academy of Sciences at Paris*, *Pliny*, *Agricola*, *Alonſo Barba*, *Ramuſio*, *Boyle*, *Hoffman*, *Liſter*, *Herrera*, *Dampier*, *Baccius*, *Pomet*, *Marſilli*, *Plot*, *Scheuchzer*, *Hales*, *Raſtel*, *Leigh*, *Boerhaave*, *Shaw*, and others.

Amongſt the vulgar Arts, that of preparing Sea-Salt for the Uſes of Mankind hath been thought worthy the notice of many great and learned Men, as well antient as modern. Thus many things relating to this Art are recorded by *Cato* and *Pliny*, *Agricola* and *Hoffman*, to whom our Author is much indebted for thoſe Memoirs that have been tranſmitted to us, relating to its Hiſtory. Had thoſe great Men been as diligent in improving this Art, as they were in recording the Improvements made therein by others, there would not now have been Occaſion to remark, that, after the Practice of ſo many Ages, an Art ſo ſimple, and withal ſo neceſſary, hath not yet been brought to any Degree of Perfection.

That

That this Art was capable of great Improvements, eſpecially as practiſed in *Great Britain*, was the Sentiment of this *Society* ſoon after its Inſtitution; at which time the Members thereof were very intent upon bringing it to a greater Perfection; as may be gather'd from the Inquiries and Suggeſtions of Dr. *Beal*, and the Hiſtories of ſeveral Methods of making Salt, which then were publiſhed by the *Society*. And although the *Engliſh* have, ſince that time, conſiderably improved their Method of boiling Salt; yet this Art is ſtill practiſed with greater Skill and Succeſs by the *Dutch*, as the ſuperior Goodneſs of the Fiſh, cured with their Salt, doth ſufficiently prove.

The Commons of *Great Britain*, having taken into Conſideration the great Importance of this Art, judged ſome Improvements propoſed therein worthy their Regard and Encouragement; well knowing, that, could this be brought to the ſame Perfection in *Britain* as in ſome neighbouring Countries, large Sums of Money might be ſaved in the Nation, which are now paid to the *French* and others; its Fiſheries improved, and its Navies and Commerce, and many of its richeſt Colonies, would no longer depend upon its Enemies for one of thoſe Neceſſaries, without which they cannot be ſupported.

Theſe Conſiderations have induced our Author to give a brief Account of the various Methods of making Salt, which are now uſed in *Great Britain*, and in other Countries, where this Art is practiſed with more Succeſs; and alſo to attempt ſeveral further Improvements for the Uſe of the *Britiſh* Dominions. How far he has ſucceeded in theſe At-

tempts, will beſt appear, if the Public ſhall think the following Propoſals ſo far worthy their Attention, as to merit a fair and impartial Trial. The principal Concluſions, deduced from a Variety of Obſervations and Experiments, are as follows: 1. That, by the Methods here propoſed, an excellent Bay-Salt may be made in *Britain* in very large Quantities, ſo as to be afforded cheaper than at the Prices paid for foreign Salt; and that the *Britiſh* Colonies in *America* may very commodiouſly be ſupplied with Bay-Salt of their own Manufacture, without having recourſe for it to the *French*, *Spaniards*, and *Portugueſe*. 2. That, by the Methods here propoſed, an excellent kind of refined white Salt may be made in *Britain*, as well from Sea-Water and Rock-Salt, as from natural Brine, in any Quantity wanted, ſo as to be afforded cheaper than foreign Bay-Salt; and which will alſo be better for curing Fiſh, Fleſh, and other Proviſions.

In forming theſe Concluſions, an impartial Regard has been had to Truth, without attending to the private Advantage of any particular Set of Men. The Senſe of this, together with a Deſire of promoting the public Advantage, has induced our Author to communicate the following Sheets at this time, although by deferring the Publication ſome time longer he might have made them poſſibly more accurate; becauſe, beſides other Conſiderations of no ſmall Import, an Opinion has prevailed, that the eſtabliſhing of Fiſheries in the North of *Scotland* would be the beſt Means of affording an uſeful Employment to more unciviliz'd Inhabitants of that Part of the Kingdom, for carrying on of which they are moſt commodiouſly ſituated.

What

What Mr. *Lowndes* * hath lately done towards the Improvement of Brine-Salt, may, perhaps by ſome, be thought to ſuperſede the Neceſſity of further Attempts for improving and extending our Salt Manufacture. Dr. *Brownrigg* is very far from depreciating the Endeavours of that Gentleman, which have met with Parliamentary Encouragement; and had his Diſcovery appeared to the Doctor ſufficiently complete and extenſive, he would not have given the Public and himſelf this Trouble. He makes no Doubt but that the Specimen of Salt, which Mr. *Lowndes* exhibited before the College of Phyſicians, was a ſtrong and pure Salt, ſince ſuch it appeared to that moſt learned Body. Whether the Alum mixed with it (agreeable to the antient Practice of the *Cheſhire* Salt-boilers) contributed any thing to its Goodneſs, is more properly conſider'd hereafter. It is only neceſſary here to obſerve, in Juſtification of the preſent Undertaking, that Mr. *Lowndes*'s Method of making Salt for curing Proviſions, doth not appear to be the beſt that may be put in Practice; ſince our Author hopes to ſhew, that, by other Methods, a purer and a ſtronger Salt may be made, and at a leſs Expence. Neither is his Method ſo general and extenſive as ſeems to be required for the public Good; ſince Mr. *Lowndes* confines it almoſt intirely to boiled Brine-Salt; and hath given no Directions concerning the Preparation of Bay-Salt. He indeed propoſes to meliorate the *Britiſh* Sea-Salt, but ſeems to deſpair of preparing a Salt either from Sea-Water, or *Engliſh* Rock-Salt, fit

* Mr. *Lowndes*'s Proceſs is inſerted in this Work. See *p.* 104 *et ſeq.*

fit for the Uſes of the Navy or Fiſheries; altho' the *Dutch* Salt, which is the ſtrongeſt and pureſt boiled Salt now made, is entirely a marine Salt, and even the Brine, of which Mr. *Lowndes* makes his Salt, is only a Solution of the *Engliſh* Rock-Salt, often in very impure Water, as is well known to the Naturaliſts.

Our Author, treating of Salt in general, takes notice of the Excellence and Uſefulneſs thereof; and that it hath pleaſed the *Author* of Nature to provide Mankind therewith in ſuch Abundance, that there are few Countries which do not afford vaſt Quantities of Rock or foſſil Salt. Mines of it have been long diſcovered and wrought in *England*, *Spain*, *Italy*, *Germany*, *Hungary*, *Poland*, and other Countries in *Europe*. Moreover the Sea affords ſuch vaſt Plenty thereof, that all Mankind might thence be ſupplied with Quantities ſufficient for their Occaſions. There are alſo innumerable Springs, Ponds, Lakes, and Rivers impregnated with common Salt, from which the Inhabitants of many Countries are plentifully ſupplied herewith.

In ſome Countries, which are remote from the Sea, and have little Commerce, and which are not bleſſed with Mines of Salt, or ſalt Waters, the Neceſſities of the Inhabitants have forced them to invent a Method of extracting their common Salt from the Aſhes of Vegetables.

In ſhort, this Salt is diſperſed all over Nature; it is treaſured up in the Bowels of the Earth; it impregnates the Ocean; it deſcends in * Rains; it fertilizes

* See *Boyle* on the Saltneſs of the Sea.

tilizes the Soil; it ariſes in Vegetables; and from them is convey'd into Animals; ſo that it may well be eſteemed the univerſal Condiment of Nature.

Naturaliſts, obſerving the great Variety of Forms under which this Salt appears, have thought fit to rank the ſeveral Kinds of it under certain general Claſſes, diſtinguiſhing it moſt uſually into Rock or foſſil Salt, Sea-Salt, and Brine or Fountain-Salt: To which may be added others of thoſe muriatic Salts, which are found in vegetable or animal Subſtances. Theſe ſeveral Kinds of common Salt often differ from each other in their outward Form and Appearance, or in ſuch accidental Properties as they derive from the heterogeneous Subſtances with which they are mixed; but, when perfectly pure, they have all the ſame Qualities; ſo that Chemiſts, by the exacteſt Inquiries, have not been able to diſcover any eſſential Difference between them. In this our Author agrees with the celebrated † *Hoffman*. Leaving therefore theſe Diviſions to thoſe whom they may concern, it may for the preſent Purpoſe be more proper to diſtinguiſh common Salt after a different Manner into the three following Kinds; *viz.* into Rock or native Salt, Bay-Salt, and white Salt.

By

* *Hoffman* de ſalinibus *Hallenſ.* cap. viii.

Ut igitur noſtra hac de re innoteſcat ſententia, hanc interponimus; ſicuti in tota univerſi hujus orbis compage, una tantum eſt aqua, unus per fermentationem paratus ſpiritus ardens, unus Mercurius, unum volatile ſal, unum acidum nitroſum ac vitriolicum ſal; ita, pari ratione unum idemque ſal commune eſt. Sed quum plures alienæ, terreæ, lapidoſæ, ſulphureæ, calcariæ minerales ac pingues particulæ cum hiſce corporibus connubium ineant, diverſa exinde emergit eorum indoles; et ſal commune idem ſemper obtineret ingenium, ſiquis pingues terreas, calcareaſque partes ab illo artificioſe ſegregaret.

By Rock-Salt*, or native Salt, is underſtood all Salt dug out of the Earth, which hath not undergone any artificial Preparation.

Under the Title of Bay-Salt may be ranked all Kinds of common Salt extracted from the Water, wherein it is diſſolved by means of the Sun's Heat, and the Operation of the Air; whether the Water, from which it is extracted, be Sea-Water, or natural Brine drawn from Wells and Springs, or Salt Water ſtagnating in Ponds and Lakes.

Under the Title of white Salt, or boiled Salt, may be included all Kinds of common Salt extracted by Coction from the Water wherein it was diſſolved; whether this Water be Sea-Water, or the ſalt Water of Wells, Fountains, Lakes, or Rivers; or Water of any ſort impregnated with Rock-Salt, or other Kinds of common Salt.

The firſt of theſe Kinds of Salt is in ſeveral Countries found ſo pure, that it ſerves for moſt domeſtic Uſes, without any previous Preparation, Triture excepted. But the *Engliſh* foſſil Salt is unfit for the Uſes of the Kitchen, until by Solution and Coction it is freed from ſeveral Impurities, and reduced to white Salt. The *Britiſh* white Salt alſo is not ſo proper as ſeveral Kinds of Bay-Salt for curing Fiſh, and ſuch Fleſh-Meats as are intended for Sea Proviſions, or for Exportation into hot Countries. So that, for theſe Purpoſes, we are obliged, either wholly

* By *Rock-Salt*, or *Sal Rupium*, the antient *Chemiſts* mean Salt adhering to the Rocks above the high Water Mark, being there lodged by the Spray of the Sea, evaporated by the Heat of the Sun; which is the pureſt Salt of all for chemical Uſes, and is to be had off the Rocks of *Sicily*, and ſeveral Iſlands in the *Weſt Indies*.
C. Mortimer.

wholly or in part, to uſe Bay-Salt, which we purchaſe in *France, Spain,* and other foreign Countries. To remedy theſe Inconveniencies this Treatiſe was wrote, in order to ſhew how the Subjects of *Great Britain* may be ſupplied with Salt of their own Manufacture, fit and ſufficient for all their Occaſions.

In order that the Methods here propoſed might be better underſtood, and that the Reaſonableneſs of them might more fully appear, the Author thought it neceſſary to premiſe a brief Account of the ſeveral Ways of preparing Bay-Salt, as well as white Salt, as far as they came to his Knowledge. From this Hiſtory may be formed a Judgment, how far the Methods now in Uſe are proper, in what deficient, where erroneous, and how they may be improved.

Bay-Salt in general may be divided into two Kinds. Firſt, Bay-Salt, drawn from Sea-Water, as is practiſed in *France, Spain, Portugal,* and many other Countries. Secondly, Bay-Salt extracted from ſalt Springs, Ponds, and Lakes; as at *Cape de Verd* Iſlands, *Tortuga,* and other Places. Of theſe the firſt is imported in large Quantities into *Great Britain* and *Ireland:* Our *American* Colonies, in Times of Peace, are chiefly ſupplied with the latter; but in Time of War they have large Quantities of Bay-Salt from *Lisbon,* and other Parts of *Portugal.*

Bay-Salt is prepared in a Manner the moſt ſimple and eaſy, when the Water of Ponds and Lakes impregnated with Salt is totally exhaled by the Force of the Sun and Air, and the Salt is left concreted into a hard Cruſt at the Bottom of the Lake or Pond. Of Salt thus prepar'd we have Inſtances

in many Parts of the World, as in the *Podolian* Deſert near the River *Boryſthenes* on the *Ruſſian* Frontiers towards *Crim Tartary*, in the Kingdom of *Algiers*, and in other Parts of the World.

Bay-Salt is alſo drawn from the Brine of Ponds and Lakes, and our Author gives us an Accoúnt of the preparing it in this manner in the *Cape de Verd* Iſlands. This Account was collected chiefly from the Relations of ſeveral Perſons of Credit, who themſelves aſſiſted in making Salt in theſe Iſlands. He alſo takes notice of the Bay-Salt made at *Tortugas*, and other Places in *America*. He deſcribes likewiſe the Manner of making marine Bay-Salt in *France*, and other Parts of *Europe*. For the Particulars of theſe Operations I muſt refer you to the Work itſelf; and only take notice, that every kind of Bay-Salt is prepared without artificial Heat, and by only expoſing the Brine under a large Surface to the Action of the Sun and Air, by which, in proportion to the Strength of the Brine, and to the different Temperature of Climate and Seaſon, the Salt chryſtallizes into what we call Bay-Salt, and comes under different Appearances to us from different Places, which ariſe principally from the Cleanlineſs and Care of the Artiſt.

Our Author, when treating of white Salt in general, acquaints us, that although Salt is made, in warm Climates, with the greateſt Eaſe, and at the leaſt Expence, by the Heat of the Sun, after the Methods already deſcribed; yet, in ſeveral Countries, where Bay-Salt might be conveniently made, they prepare all their Salt by culinary Fires. Thus in *Auſtria*, *Bavaria*, and many other Parts of *Germany*, and alſo in *Hungary*, and even in ſome Parts of *Italy*, they conſtantly boil the Water of

their ſalt Springs into white Salt. But in other Parts of *Europe*, as in *Britain*, and in the Northern Parts of *France* and *Germany*, an erroneous Opinion long prevailed, that the Heat of the Sun was not there ſufficiently intenſe, even in the Summer Seaſon, to reduce Sea-Water, or Brine, into Bay-Salt. And all Arguments would probably have been inſufficient to remove this Prejudice for the *Engliſh*, had not the contrary been fully proved by Experiments, which were firſt accidentally made in *Hampſhire*. However, the Method of making Salt by Coction will probably ſtill continue to be practiſed in *Britain*; as the Salt ſo prepared is for ſeveral Uſes preferable to Bay-Salt; and when prepared after a particular Manner, is preferable to common Bay-Salt, even for curing Proviſions, as the Practice of the *Hollanders* ſufficiently teſtifies: So that the due and right Preparation of white Salt ſeems very deſerving of the Notice and Regard of the Public.

White Salt, as it is prepared from various ſaline Liquors, may therefore be diſtinguiſhed into the following Kinds:

1. Marine boiled Salt, which is extracted from Sea-Water by Coction. 2. Brine or Fountain-Salt, prepared by Coction from natural Brine, whether of Ponds or Fountains. 3. That prepared from Sea-Water, or any other kind of Salt-Water, firſt heightened into a ſtrong Brine by the Heat of the Sun, and the Operation of the Air. 4. That prepared from a ſtrong Brine or *Lixivium* drawn from Earths, Sands, or Stones impregnated with common Salt. 5. Refined Rock-Salt, which is boiled from a Solution of foſſil Salt in Sea-Water, or any other kind of ſalt Water, or pure Water. 6. Laſtly, Salt upon Salt, which is Bay-Salt diſſolved in Sea-Water,

or any other ſalt Water, and with it boiled into white Salt; and under theſe Heads may be ranked the ſeveral kinds of boiled Salt now in Uſe. Our Author has given us an exact Hiſtory of the Manner of preparing theſe different kinds of Salt, as practiſed in different Places, with miſcellaneous Obſervations and Cautions relating to their reſpective Proceſſes, for which in the general I muſt refer you to the Work itſelf: But the making Salt upon Salt deſerves more particular Attention; as the Author, being under no Tie of Secrecy, has revealed to us the Method of making in *Holland* and *Zealand* that ſtrong and pure kind of Salt, with which they cure Herrings, and all other Proviſions for long keeping; which gives the *Dutch* a great Advantage over all other Nations in the Herring-Fiſhery; ſince Fiſh preſerved with this Salt look much cleaner and fairer than thoſe that are cured with Bay-Salt, and keep much better than thoſe preſerved with any other kind of white Salt.

From the Proceſs whereby white Salt is made from Sea-Water by Coction, it appears, that Sea-Water, beſides common Salt, contains ſeveral other Ingredients; ſome of which are ſeparated before the common Salt falls, and others remain in the Bittern, after all the Salt is extracted. Our Author has given a full and circumſtantial Account of theſe in an expreſs Chapter, under the Appellation of Memoirs for an Analyſis of Sea-Water.

The Salt-Boilers, and particularly thoſe who prepare Brine-Salt, have long been accuſtomed to make uſe of various Subſtances, which they call Additions or Seaſonings, and mix them with the Brine while it

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is boiling, either when they firſt obſerve the Salt begin to form, or elſe afterwards during the Time of Granulation. Theſe Additions they uſe for various Purpoſes. Firſt, to make the Salt grain better, or more quickly form into Chryſtals. Secondly, to make it of a ſmall fine Grain. Thirdly, to make it of a large firm and hard Grain, and leſs apt to imbibe the Moiſture of the Air. Fourthly, to render it more pure. And laſtly, to make it ſtronger, and fitter for preſerving Proviſions.

Theſe Addit ons, moſt commonly uſed to anſwer the above-mention'd Purpoſes, are Wheat-Flour, Reſin, Butter, Tallow, new Ale, ſtale Beer, Bottoms or Lees of Ale and Beer, Wine-Lees and Alum. Wheat-Flower and Reſin are uſed for the Property they poſſeſs of making the Salt a ſmall Grain. Butter, Tallow, and other unctuous Bodies are commonly applied, as they are ſaid to make the Brine chryſtallize more readily; for which End ſome Salt-Boilers more particularly prefer the Fat of Dogs: But others have little to plead for their uſing theſe Subſtances, but immemorial Cuſtom: How far they have the Effects aſcribed to them can only be determined by Experiments, as ſeveral Boilers, who formerly uſed them, now find they can make as good Salt without them. Wine-Lees, new Ale, ſtale Ale, the Lees of Ale and Beer are now generally rejected by the marine Salt-Boilers; except in the Weſt of *England*, where the Briners, who uſe them, affirm that they raiſe a large Grain, and make their Salt more hard and firm, and ſome ſay that they make it chryſtallize more readily. *Hoffman* prefers the ſtrongeſt Ale; and *Plot* aſſures us, that

it

it makes the Salt of a larger or ſmaller Grain, according to the Degree of its Staleneſs. The only good Effects that fermented Liquors can have as an Addition, are probably owing to their acid Spirit, which may correct the alcaline Salts of the Brine, and ſo render the common Salt more dry and hard, and leſs apt to diſſolve in moiſt Air. If therefore it ſhould be thought neceſſary to uſe any of theſe Additions, in order to correct the alcaline Quality of the Brine, ſtale Ale, or *Rheniſh* Wine *, ought to be choſen, as new Ale contains but little Acid.

Alum is an Addition long known and uſed in *Cheſhire*, together with Butter, to make the Salt precipitate from ſome Sorts of Brine, as we are aſſured by Dr. *Leigh* in his Natural Hiſtory of *Lancaſhire*, *Cheſhire*, &c. who firſt taught the *Cheſhire* Salt-Boilers the Art of refining Rock-Salt. As the bad Properties of their Salt proceeded from hard boiling, they found every Method ineffectual, until they had recourſe to a more mild and gentle Heat. And as Alum hath been long diſuſed amongſt them, it is not likely, that they found any extraordinary Benefit from it; otherwiſe they would ſcarce have neglected it, and continued the Uſe of Butter. However Mr. *Lowndes* hath lately endeavour'd to revive its Uſe; aſſerting, that Brine-Salt hath evermore two main Defects, Flakyneſs and Softneſs; and to remedy theſe Imperfections, he tried Alum, which fully anſwered every thing he propoſed; for it reſtored the Salt to its natural cubical Shoot, and gave it a proper Hardneſs; nor had it any bad Effect whatever. But our Author is of Opinion, that whoever conſiders the Nature of Alum, will ſcarce expect

* Why not Malt-Vinegar? *C. M.*

pect ſuch extraordinary Effects from it. Neither does it here ſeem wanted; for the Grains of common Salt will always be ſufficiently hard, and of their natural Figure, large Size, and no-ways diſpoſed to run by the Moiſture of the Air, if formed by a gentle Heat, and perfectly free from heterogeneous Mixtures: So that the Goodneſs of Mr. *Lowndes's* Salt does not ſeem owing to the Alum, with which it is mixed, but chiefly to the gentle Heat uſed in its Preparation.

The *Dutch*, who have long ſhewn the greateſt Skill and Dexterity in the Art of boiling Salt, make uſe of another Addition, which they eſteem the greateſt Secret of their Art. This is Whey, kept ſeveral Years till it is extremely acid; now firſt revealed by our Author to the *Britiſh* Salt-Boilers, but long held in great Eſteem by the *Dutch*, for the good Effects it hath upon their Salt; which it renders ſtronger, more durable, and fitter to preſerve Herrings, and other Proviſions.

Bay-Salt, as well as white Salt, is of different Kinds, and poſſeſſed of different Qualities: With the different Kinds of theſe Proviſions muſt be cured, according to the Uſes for which they are deſigned. The *Dutch* indeed uſe no Salt for curing Proviſions, beſides their own refined Salt. With it they can preſerve Fleſh and Fiſh of all Kinds as well as with the ſtrongeſt Bay-Salt; and chuſe to be at the Expence of refining Bay Salt, rather than to defile their Proviſions with the Dirt and other Impurities, with which it commonly abounds.

Salt, eſteemed the beſt for curing Proviſions, and for preſerving them the longeſt time, is that which is the ſtrongeſt and the pureſt. This may be known by

the following Characteriſticks; *viz.* it is uſually concreted into large Grains or Chryſtals, which are firm and hard, and in reſpect to thoſe of other Kinds of common Salt, the moſt ſolid and ponderous; it is not diſpoſed to grow moiſt in a moderately dry Air, to which it has been expoſed a conſiderable time; its Colour is white, and ſomewhat diaphanous; it hath no Smell; its Taſte is truly muriatic, and more ſharp and pungent than that of other Kinds of common Salt. It has, beſides theſe, ſeveral other diſtinguiſhing Properties mentioned by our Author. The Salts, which approach neareſt to this Degree of Perfection, are the beſt Kinds of Bay-Salt, and the ſtrong *Dutch* refined Salt; but moſt of the Salt now made for Sale is very far from anſwering to theſe Characteriſtics.

Having related the various Methods of preparing Salt that now are in Uſe, as far as they are come to our Author's Knowledge, it appears, that this Art is not brought to ſuch Perfection in the *Britiſh* Dominions as in ſeveral other Countries, the Salt there prepared being unfit for preſerving many Kinds of Proviſions. It remains now to ſhew, that this Want of a ſtrong Salt of *Britiſh* Manufacture proceeds not from any Defect in Nature, but of Art; and that, if proper Skill and Induſtry be uſed in the *Britiſh* Dominions, and due Encouragement there given by the Legiſlature, ſuch Improvements may be made in this Art, that not only *Great Britain*, but *Ireland* alſo, and the *Britiſh* Colonies in *America*, may be ſupplied with Salt of their own Manufacture, proper for curing all Kinds of Proviſions, in Quantity ſufficient for all their Occaſions, in Quality equal, if not ſuperior, to any foreign

Salt

Salt now made, and at a moderate Price. Theſe are Truths, which the Author hopes will appear evident from the Facts and Reaſonings contained under the following Poſitions:

Lemma I. The Quantity of Water which annually falls in Rain, Snow, and Hail, is very different in different Parts of *Great Britain*; there commonly falling almoſt double the Quantity on the Weſtern Coaſts, that falls on the Eaſtern Coaſts of that Iſland.

Lemma II. The Quantity of Rain which falls in *Lancaſhire*, during the four hotteſt Months of the Year, *viz. May*, *June*, *July*, and *Auguſt*, doth not at a Medium amount to more than a third Part of the Quantity of Water, which falls in Rain, Snows, and Hail, during the whole Year.

Lemma III. The Water which aſcends in Vapours from the Sea very greatly exceeds that which deſcends thereon in Rain and other aqueous Meteors: But the Quantity of Water, which uſually exhales from a given Part of the Ocean in a given Time, cannot with any Exactneſs be determined.

Lemma IV. The Quantity of Water which commonly exhales in *Great Britain* from ſhallow Ponds during the four hotteſt Months of the Year, greatly exceeds the Quantity of Rain which commonly falls on the Surface of thoſe Ponds during the ſaid Months.

From theſe *Lemmata*, which the Author has ſupported by the Obſervations, not only of himſelf, but of other learned Men, are deduced the following Propoſitions:

Propoſition I. In ſeveral Parts of *England* large Quantities of Bay-Salt may be extracted from Sea-Water during the hotteſt Months of the Year, by receiving the Salt-Water into Ponds, and ſuffering its aqueous Parts thence to exhale by the Heat of the Sun, and the Operation of the Air and Winds.

Prop. II. In ſeveral Parts of *England* large Quantities of Bay-Salt may very commodiouſly be extracted from Sea-Water, after the ſame manner that is practiſed in *France*, and in other Parts of *Europe*.

Prop. III. Bay-Salt may be extracted in *England* from Sea-Water in larger Quantities, and with more Certainty, than by the foregoing Method, if Care be taken to preſerve the Brine contained in the Salt-Pits from being diluted with Rains, and to promote the Evaporation of the Water by ſeveral artificial means, which may eaſily be put in Practice.

Prop. IV. In ſeveral Parts of *England* large Quantities of excellent Bay-Salt may with great Eaſe be made from the natural Brine of ſalt Springs, and alſo from Rock-Salt diſſolved in weak Brine or Sea-Water.

Prop. V. Bay-Salt may be prepared in *England* by the foregoing Methods at a very moderate Expence, equal in Goodneſs to the beſt foreign Bay-Salt, and in Quantity ſufficient for the Conſumption of all the *Britiſh* Dominions.

Prop. VI. In ſeveral of the *Britiſh* Colonies in *America*, Bay Salt might, with little Expence and Trouble, be prepared from Sea-Water, in Quantities ſufficient to ſupply the *American* Fiſheries, and

and all other Occaſions of thoſe Colonies, ſo as to become a conſiderable Branch of their Trade.

The Author has ſupported all theſe Propoſitions with great Ingenuity; but I cannot paſs over in Silence the artificial means to promote the Evaporation of Sea-Water, mention'd in *Prop.* III. as well as to preſerve the Brine contained in the Salt-Pits from being diluted with Rains. I therefore ſhall lay before you a ſhort Account of theſe.

It will be proper, ſays our Author, to make all the Salt-Pits of the Marſh in one long Row extended from Eaſt to Weſt, and for each Pit to make Covers of thin Boards, or rather of coarſe Canvas, or Sail-Cloth, ſtretched on Frames of Wood and painted white. Theſe Covers muſt all be fixed with Hinges to ſtrong Poſts and Beams on the North Side of the Pits; ſo that they may be let down and drawn up with Cords and Pulleys, or by ſome other Contrivance, ſomewhat like Drawbridges. Theſe Covers thus fixed may be let down over the Pits like a Shed or Penthouſe in rainy Weather; and in dry Weather may be erected almoſt to a a Perpendicular, but inclining a little towards the South; ſo as to form a Wall with a South Aſpect. Thus theſe may ſerve a double Purpoſe, as Coverings for the Pits in wet Weather, and as Reflectors of the Sun's Heat upon them in dry Weather, and thus greatly promote the Evaporation of the aqueous Parts of the Brine. The Hinges on which the Reflectors turn may be fixed about eight or ten Inches from the Ground; by which means, when the Reflectors ſtand upright, there will be an Opening left beneath them, through which the Air will continu-

ally

ally flow in a brisk Current, and greatly increaſe the Evaporation of the Water.

After having gone through that Part of Dr. *Brownrigg*'s Work, which relates to Bay-Salt, we proceed to the Methods that Gentleman propoſes for preparing and improving white Salt, which, if brought into Uſe, may probably be of Advantage not only to private Undertakers, but alſo to the Public. For it appears, that two very different Kinds of white Salt are required; the one for the Uſe of the Table, and the other as a Condiment for Proviſions. Its Whiteneſs, Dryneſs, and the Smallneſs of its Grain, are the Properties which chiefly recommend the firſt Kind; and its great Strength and Purity the latter. It is this ſtrong and pure Kind of white Salt, which is wanted in the *Britiſh* Dominions; and it is therefore our Author's principal Deſign here to conſider how this Defect may be ſupplied; although at the ſame time Inſtructions are given how to prepare Table-Salt, not only better in Quality, but alſo at a leſs Expence than it is now prepared by the common Methods.

Lemma I. In the common Proceſſes for making white Salt, the Salt is deprived of a conſiderable Part of its acid Spirit, by the violent Boiling uſed in its Preparation.

Lemma II. Moſt Kinds of white Salt are render'd impure by the Mixture of various heterogeneous Subſtances.

Lemma III. White Salt, by the violent Coction commonly uſed in its Preparation, is render'd leſs fit for preſerving Fiſh, Fleſh, and other Proviſions, than it would be if prepared with a more gentle Heat.

Lemma

Lemma IV. The heterogeneous Subſtances which are commonly mixed with white Salt, render it leſs proper for preſerving Proviſions, than it would be if ſeparated from them.

After having fully conſider'd the foregoing, our Author gives a Method of preparing a Kind of white Salt proper for curing Fiſh, Fleſh, and other Proviſions; likewiſe a Method of refining Salt; but for theſe I muſt refer you to the Work itſelf, as well as for the Tables, wherein the ſeveral Expences attending theſe Operations are minutely conſider'd.

Moſt of the Facts referred to in theſe Diſquiſitions are ſuch, as the conſtant Practice of thoſe who make Salt ſufficiently warrants us to rely upon for true and certain; or elſe, they are the Obſervations of judicious Salt-Officers, daily converſant in theſe Matters, or of curious and inquiſitive Navigators, Merchants, Travellers, and Naturaliſts; or, laſtly, the Experiments of many learned Phyſicians, Chemiſts, and Philoſophers: The Truth of which ſeveral Facts, though many of them have long been publiſhed, hath never been called in Queſtion. So that theſe Obſervations and Experiments may probably be more relied on by the Public, than if they had only been made by our Author; ſince they have the Teſtimony of many skilful and unprejudiced Perſons, who could have no Notion of the Uſes to which they have been here applied. If therefore the Arguments founded upon thoſe Facts ſhould be eſteemed any ways reaſonable and ſatisfactory, the Author preſumes to remark, that it might not be unworthy the Wiſdom of the *Britiſh* Legiſlature to direct

direct a more full Inquiry to be made into a Matter of this Importance, and to order proper Works to be erected for making Bay-Salt, and for making and refining white Salt, and to put thoſe Works under the Management of able and judicious Perſons, to make exact and accurate Trials, in order to diſcover the beſt and cheapeſt Methods of doing them. And the Methods, which ſhould be moſt approved of, might for the general Good be made public, and eſtabliſhed by Law as a common Standard, to which all thoſe who make Salt in the *Britiſh* Dominions ſhould be obliged to conform.

However imperfect this Extract may appear, I muſt now beg your Indulgence for having taken up more of your Time than is uſually allow'd to Works of this kind. I muſt plead in my Excuſe the great, the National Importance of the Work itſelf, the maſterly Manner with which the Subject-Matter is treated, as well as its falling in ſo exactly with that Inſtitution, in which we are ſo deſirous of diſtinguiſhing ourſelves. The making and refining Salt muſt certainly be conſidered as one of thoſe mechanic Arts, the Hiſtory of which, as we are taught by the noble * *Verulam*, is a neceſſary Part of that Knowledge, that true Science of Nature, which is not taken up in vain and fruitleſs Speculations, but effectually labours to relieve the Neceſſities of human Life.

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* *Verulam de Aug. Scient.* lib. II. cap. 2.